



THE CITY OF SAN DIEGO

City of San Diego
Planning & Development Review
Building Development Review
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Building Newsletter 5-3

Area Separation Walls

Interpretations of State and Local Building Codes
1998 California Building Code: Chapter 5
Revision Date: August 2000

Page 1 of 15

I. Purpose

One of the most-used special purpose fire assemblies in the California Building Code is the area separation wall.

Section 504.6 of the CBC establishes criteria for the use and construction of these walls. In the interest of uniform interpretation of this section, the following building newsletter has been developed.

- A. Each portion of a building separated by one or more complying area separation walls may be considered a separate building.

This allows adjacent construction to be of different types, which is not otherwise permitted by Code.

- B. Area separation walls can be used to construct buildings of virtually unlimited area.

1. Use of yards is another method of increasing allowable building area.
2. Use of yards combined with construction of area separation walls maximizes allowable building area. Figure 1 shows a building separated into three sections by the use of area separation walls. Sections "A" and "C" may use three yards "a" and "c" for purposes of area increase; section "B" may use only two yards "b".

Figure 1/Maximizing allowable building area

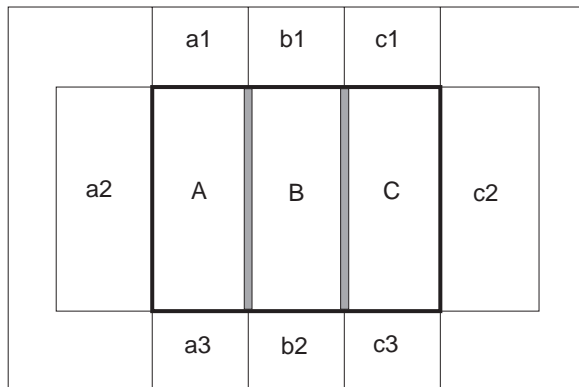
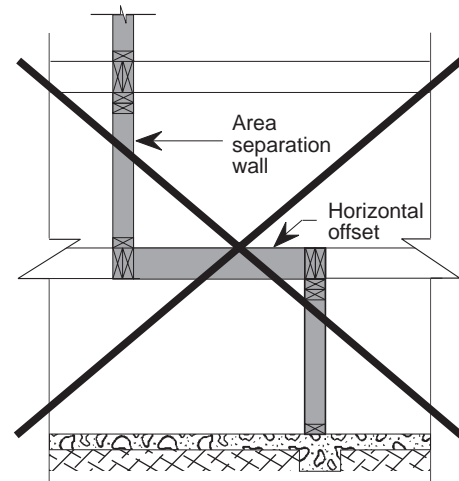


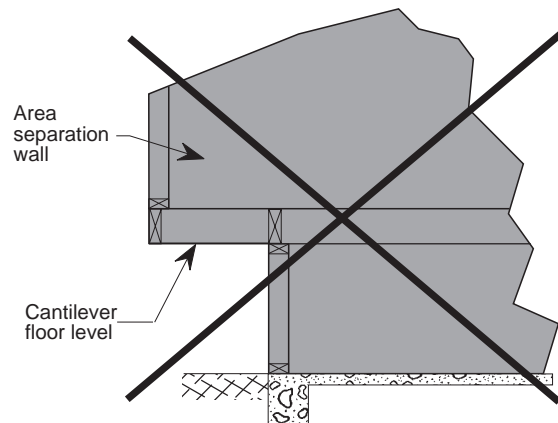
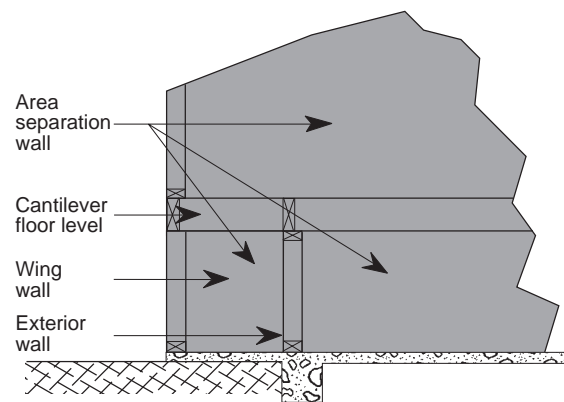
Figure 2/Horizontal offsets not permitted



Legend

	Two-hour area separation wall (unless noted otherwise).
	One-hour construction with openings protected by 3/4-hour assemblies. Opening size is limited per Section 503.2.2 (consider full length of wall requiring wall and opening protection).
	One-hour construction with no openings allowed.
	Typical construction with protection governed by other Code sections.
	One-hour construction of projection.
	Location of assumed property line.

Where distances "a" and "b" are specified in Figures 8, 9, 10 and 11, they are the distances to the property line required to allow unprotected openings in sections "A" and "B", respectively. These distances will vary with the occupancy and type of construction per Table No. 5-A and/or Sections 602.3, 603.3, 604.3, etc.

Figure 3/Cantilever floor levels not permitted**Figure 4/** Wing wall enables compliance

II. Extent of Walls

Section 504.6.4 uses the specific word “wall” and states that such “wall” shall “extend vertically from the foundation to a point at least 30 inches above the roof.” Exceptions to the parapet requirements will be discussed later. The dictionary defines a wall as an upright structure of wood, stone, brick, etc., serving to enclose, divide, support or protect. Clearly, a wall is a vertical element rather than a horizontal element such as a floor, roof or ceiling.

- A. Horizontal offsets, as illustrated in Figure 2, do not comply with the stated requirement. Obviously the horizontal portion is not a “wall”, nor does the “wall” extend continuously from the foundation to a point 30 inches above the roof.
- B. The cantilevered floor level shown in Figure 3 illustrates another configuration which does not comply because the wall above does not extend down to the foundation. The condition in Figure 3 can be made to comply if a wing wall is added, as shown in Figure 4.
- C. Although Section 504.6.4 makes no provision for horizontal construction to serve as an area separation, two-hour area separation walls provided for

Group A, Division 3; Group B, and M Occupancies; or Group R, Division 1 Occupancies may terminate at the three-hour occupancy separation occurring between the A-3, B, M or R-1 Occupancy and the Group S Division 3 Occupancy below when the building is constructed in accordance with the provisions of Section 311.2.2. This same horizontal separation is not, however, applicable to four-hour area separation walls, other occupancy combinations, or within the individual A-3, S-3, B, M or R-1 Occupancies.

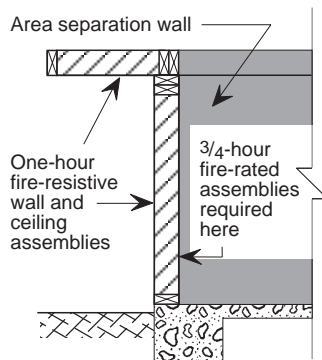
III. Projections

Area separation walls should extend the full width of the building being separated.

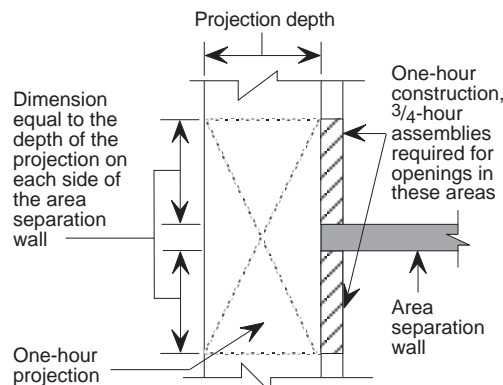
- A. Two-hour walls need not extend to the outer edges of horizontal projecting elements such as balconies, roof overhangs, canopies, marquees or architectural projections, provided the exterior wall and projection at the termination of the area separation wall satisfy certain requirements. See Section 504.6.3.
- B. When two-hour area separation walls do not extend to the outer edge of any horizontal projecting element, the area separation wall must terminate at an exterior wall which is of not less than one-hour fire-resistive construction for a distance not less than the depth of the projecting element on both sides of the area separation wall. Openings are permitted within the required width of this one-hour fire-resistive exterior wall provided any such openings are protected with self closing or heat de-

Figure 5/Framing

Case 1/ Cantilever framing

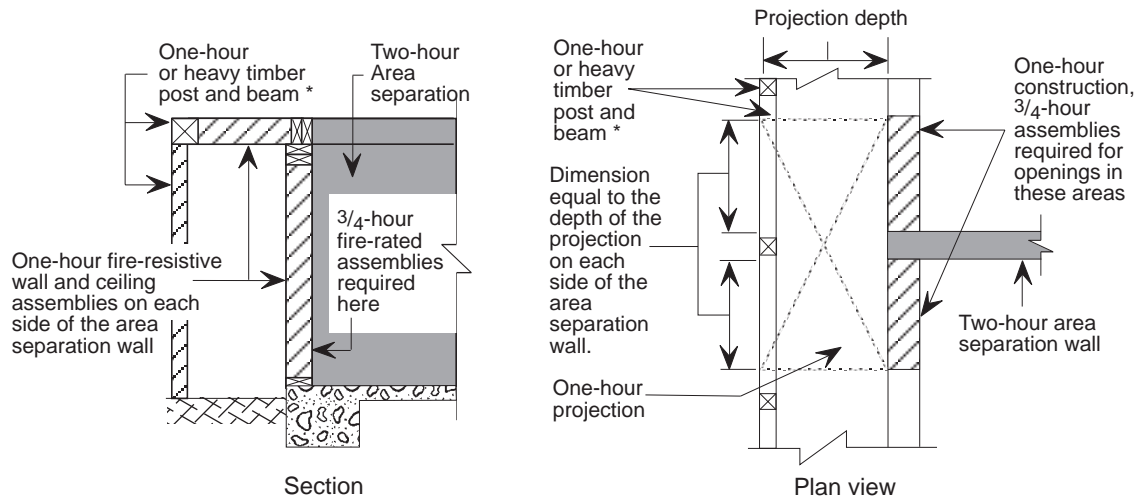


Section



Plan view

Area separation wall must terminate at an exterior wall which is of not less than one-hour fire-resistive construction for a distance not less than the depth of the projecting element on both sides of the area separation wall. Openings are permitted within the required width of this one-hour fire-resistive exterior wall provided any such openings are protected with self closing or heat de-

Figure 5/Framing (continued)**Case 2/Post and beam framing**

* NOTE: The entire beam span and supporting elements must be of one-hour fire-resistive construction.

tector activated-automatic closing, assemblies having a three-fourths-hour fire-protection rating. In addition, the projecting elements must be of at least one-hour fire-resistive construction for the same width. Figure 5, Cases 1 and 2 illustrate conditions which comply with these requirements.

- C. When a projecting element contains a concealed space, the two-hour area separation wall must extend through the concealed space to the outer edge of the projecting element. Figure 6 illustrates this condition. Here, the area separation wall extends through the enclosed space at the projecting element. One-hour fire-resistive construction is provided for the projection and exterior wall of appropriate length, as shown in the plan view of Figure 6. It should be noted that projecting floors as illustrated in Figure 3 do not

qualify under this exception.

- D. In multi-story buildings, the required width of one-hour wall returns must be maintained on all walls located beneath the projection, as illustrated in Figure 7, Cases 1 and 2. Note that the required width of returns may vary from floor to floor due to possible variations in the depth of the projection at each floor level.

IV. Protection at Building Corners

The figures shown so far illustrate straightforward conditions to which Code provisions are easily applied. This section only applies to two-hour area separation walls shown in Figures 8 through 12.

- A. The Code is silent as to how fire protection is to be provided where a two-hour area separation wall

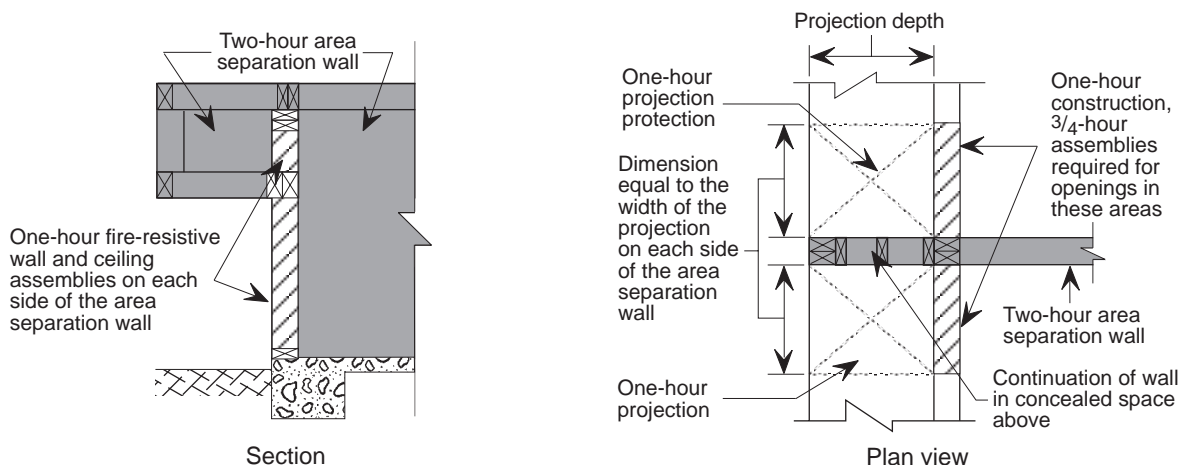
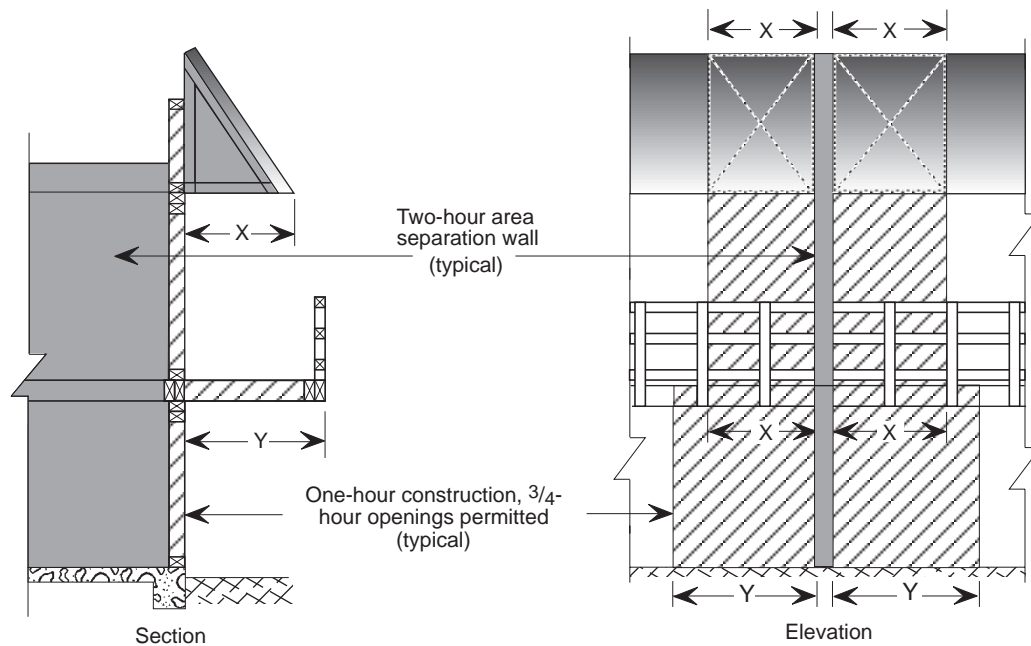
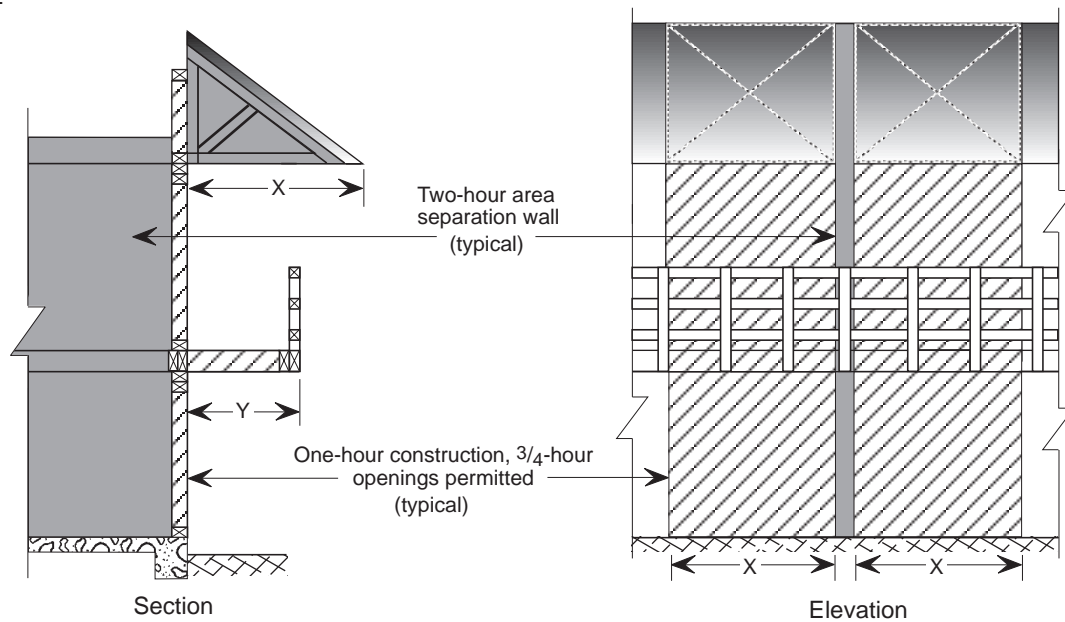
Figure 6/Area separation wall extension through concealed spaces

Figure 7/Required width of wall returns**Case 1**

This case shows that for distance "X" < "Y", the required width of exterior wall protection changes from width "X" at the upper level to width "Y" at the lower level.

Case 2

This case shows that when "X" exceeds "Y", the width of exterior wall protection required due to the depth of overhang "X" must be maintained to the foundation.

ends at a corner between two separated segments of a building. In these cases, the degree of protection may be provided as dictated by an assumed property line.

1. The approach shown in Figure 8, Option 1 is consistent with Section 503.3 of the UBC, which addresses the subject of protection between buildings on the same property. This means that wall and opening protection must be provided relative to an assumed property line, as specified in Table No. 5-A or the relevant sections of chapter 6 of the 1998 CBC, for the occupancy involved.

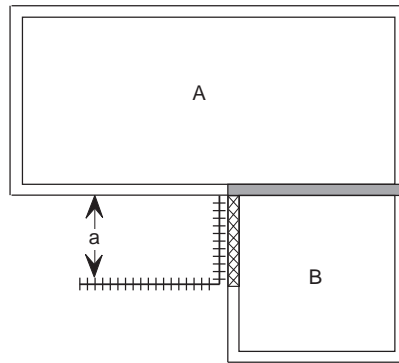
2. Another method of providing protection is shown in Figure 8, Option 2. This method has no Code reference. It is an alternate equivalent to the assumed property line for area separation wall application only.

- B. For cases where the area separation wall terminates at a corner which also contains exterior balconies, the accompanying corner protection examples, as well as Code requirements for projections, must be utilized.

1. If the area separation wall is extended to the outer edge of the projection, protection equivalent to that shown in Figure 9, Options 1 and 2 may be used with additional protection of the overhang as shown.
2. When the area separation wall is not extended to the outer edge of the projection (balcony, eave, etc

Figure 8/Methods of protection at building corners

Option 1



Option 2

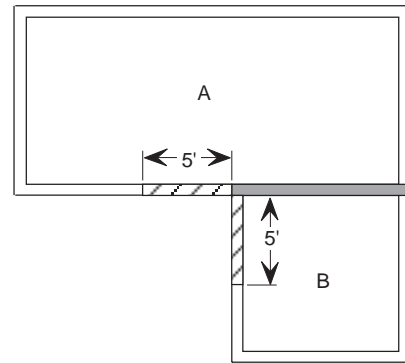
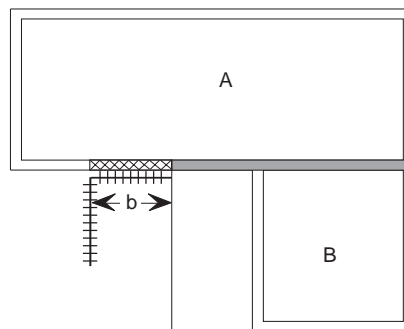
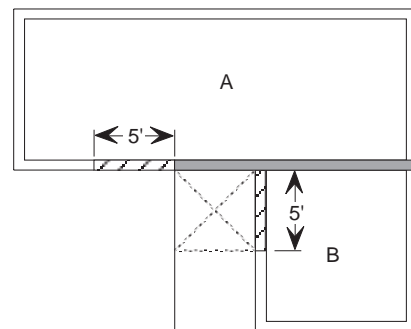


Figure 9/Methods of protection at building corners with single balconies

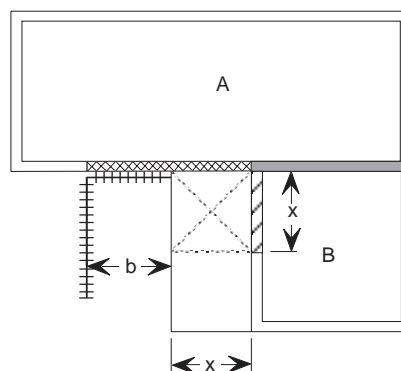
Option 1



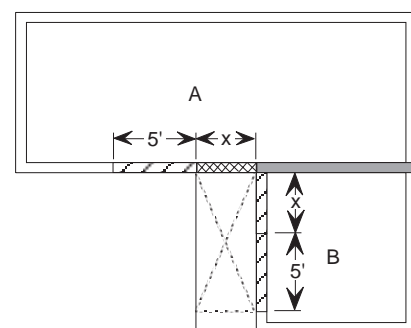
Option 2



Option 3

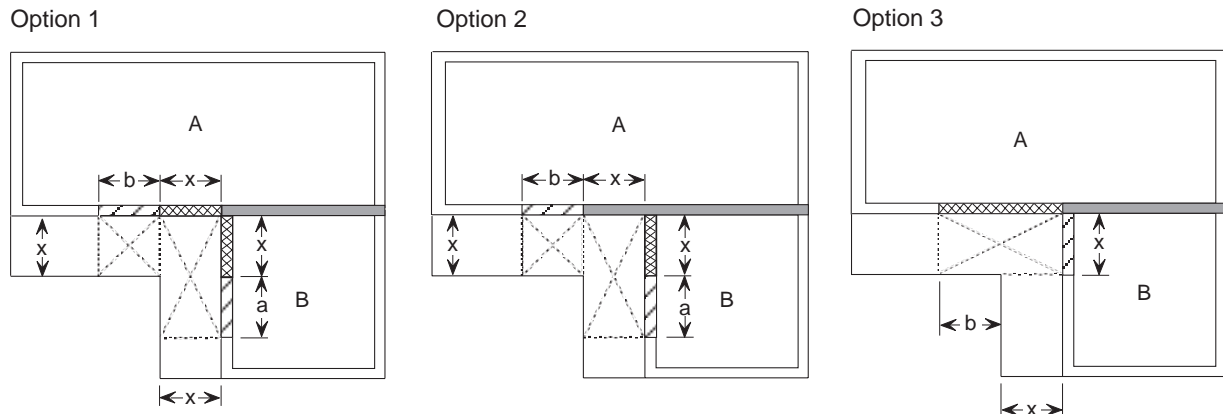


Option 4



...) Options 3 and 4 in Figure 9 may be used. In these two cases, additional protection along both exterior walls that intersect at the end point of the area separation at Option 3 and 4 has been added in the form of one-hour construction on one side of the area separation wall.

C. It is evident that the use of an assumed property line cannot be consistently applied when projections extend in both directions beyond the termination point of

Figure 10/Methods of protection at building corners with intersecting balconies

the area separation wall at Figure 10.

The three options shown in Figure 10 are alternate equivalents to the protection intended by the Code and will adequately prevent the spread of fire from one portion of the building to the other.

D. Various additional building layouts are shown in Figure 11, Options 1 through 7.

E. The minimum distance required between balconies located on either side of an area separation wall such

that no overhang or projection protection is required is either:

1. A clear width equal to the width of the projection on each side of the area separation wall, or
2. A distance equal to that which would allow unprotected openings based on the distance from an assumed property line originating at the termination of the area separation wall.

Examples of these two cases are shown in Figure 12. The least restrictive of the two options

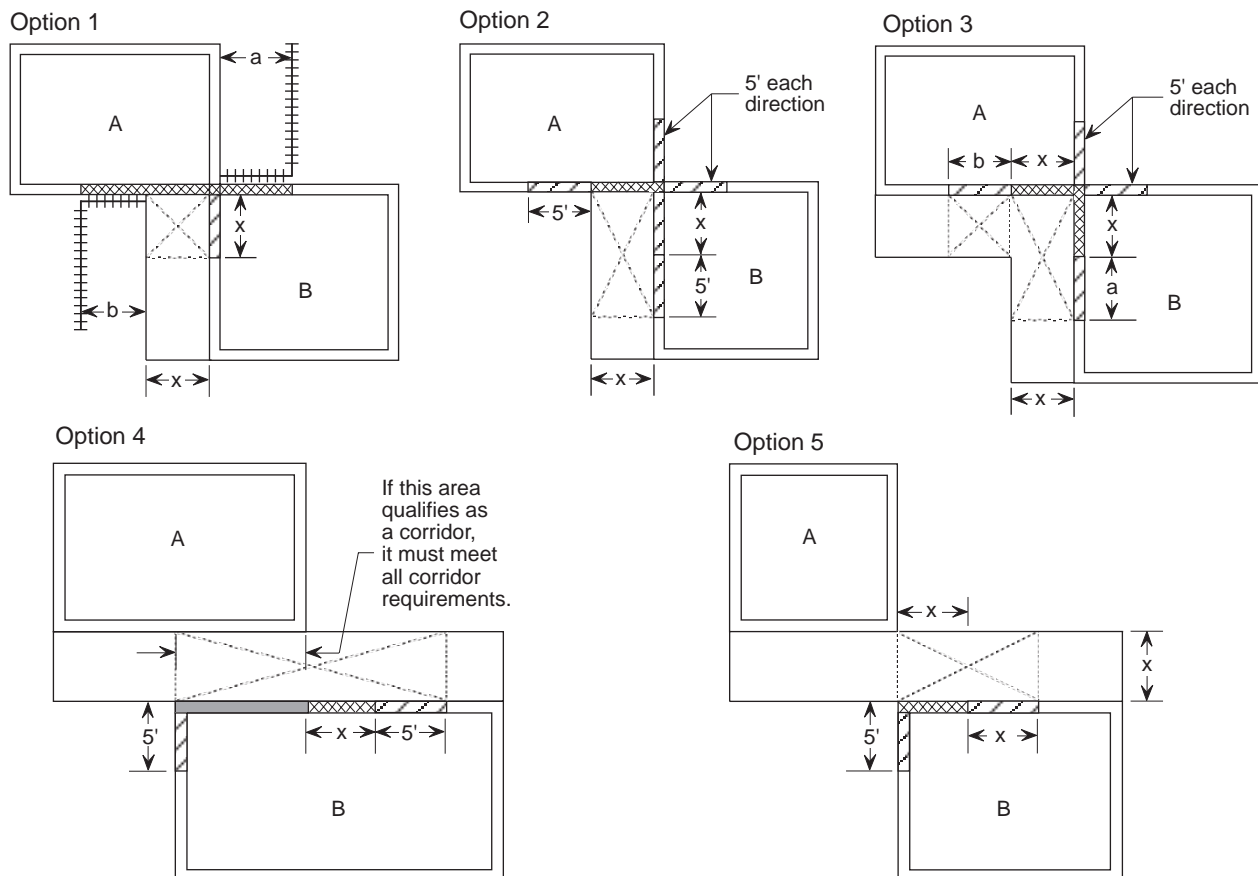
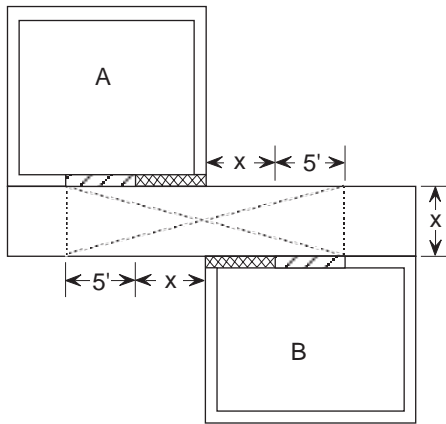
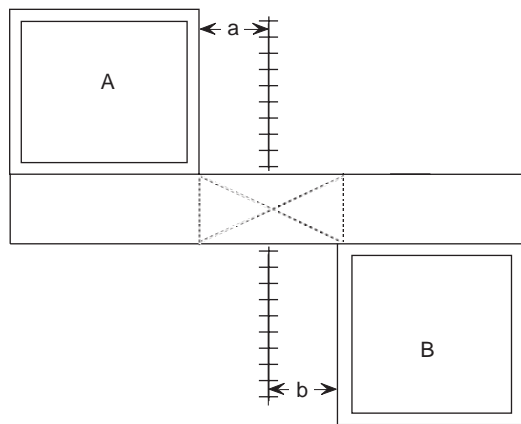
Figure 11/Additional layouts

Figure 11/Additional layouts (continued)

Option 6



Option 7



will be allowed.

Both cases in Figure 12 illustrate a Type V, nonrated apartment building with a two-hour area separation wall. Note that for Case 2 only, the provisions of Sections 503.2 and 705 can be applied to the area between the balconies, allowing an 8-foot clear distance between the balcony edges. It is not the intent to require a one-foot strip of one-hour construction for the overhang.

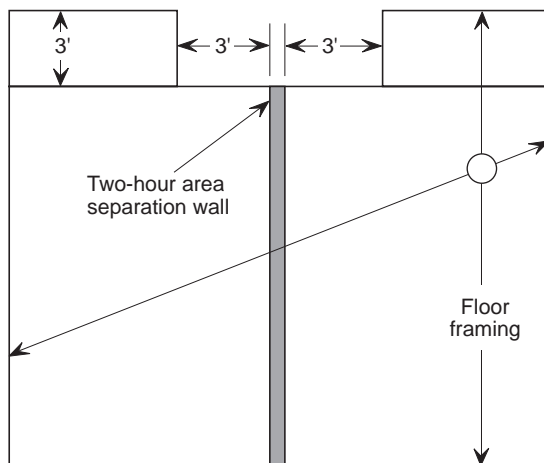
V. Parapets

As previously stated, an area separation wall must extend from the foundation to a point at least 30 inches above the roof.

- A. The provisions of 709.4.2 should be used for cases where the two-hour area separation wall parapet is required to separate portions of buildings with sloping roof construction. This is illustrated in Figure 13.

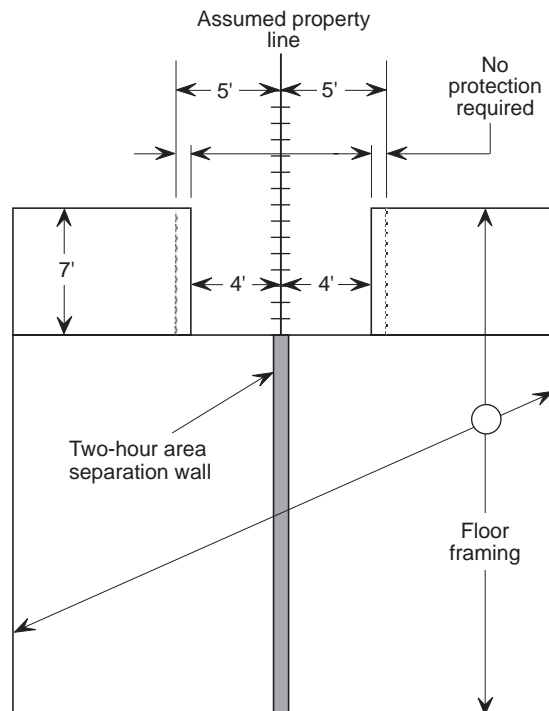
Figure 12/Type V, nonrated apartment building with no projection protection required

Case 1/Three-foot cantilever balcony



Plan view

Case 2/Seven-foot cantilever balcony



Plan view

B. The general rule is illustrated in Figure 14, Case 1 below. Section 504.6.4 lists three exceptions to the general rule:

1. Area separation walls of either two- or four-hour construction may terminate at the underside of roof sheathing, deck or slab, provided the roof-ceiling assembly is of at least two-hour fire-resistive construction. This exception is applicable only where the entire roof system is of two-hour construction. See Figure 14, Case 2.
2. Two-hour area separation walls may terminate at the underside of the roof sheathing, deck or slab, provided:
 - a. Where the roof-ceiling framing elements are parallel to the walls, such framing and elements supporting such framing shall be of

Figure 13/ Parapet height with sloping roof construction

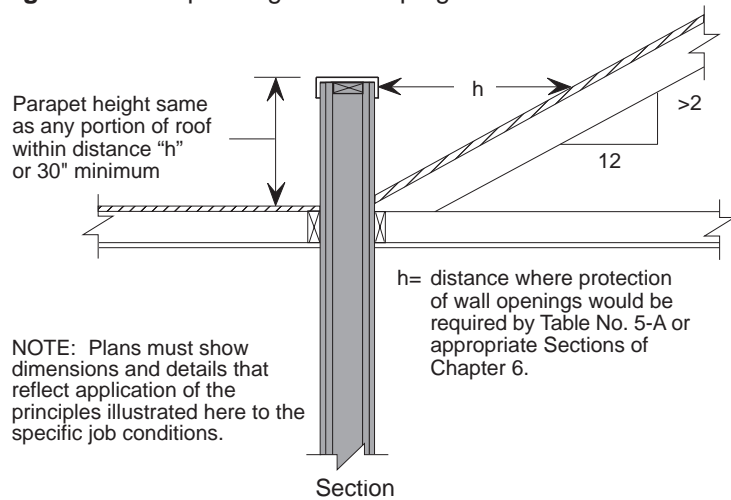
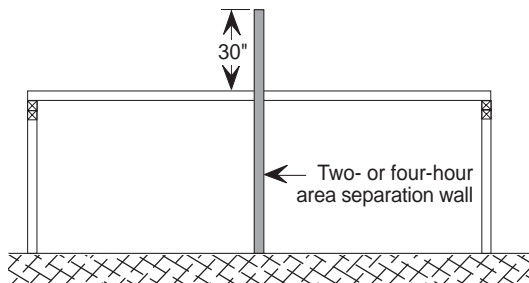
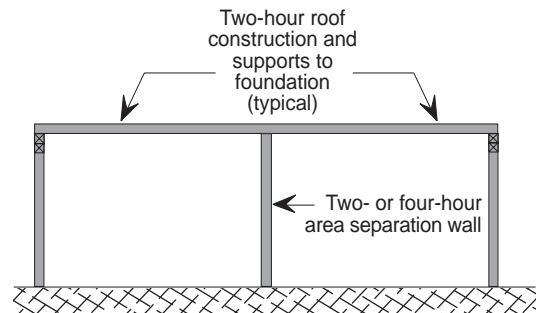


Figure 14/ Area separation wall parapet requirements

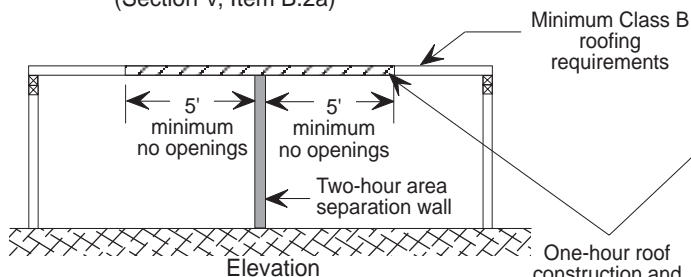
Case 1/ Basic requirements



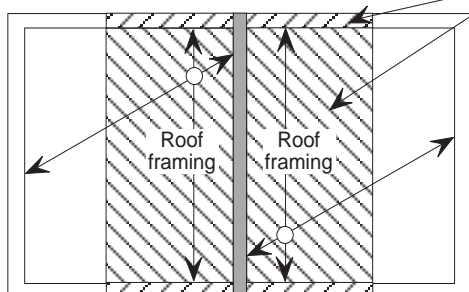
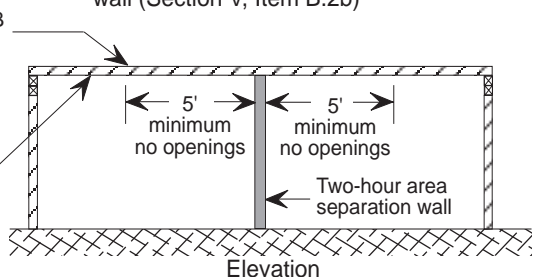
Case 2/Two-hour roof construction (Section V, Item B.1)



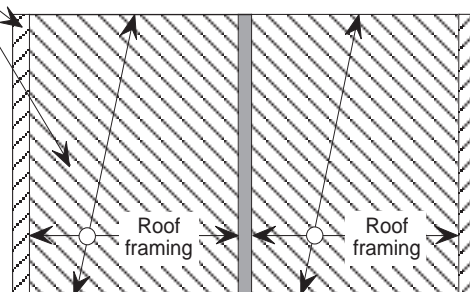
Case 3/ One-hour roof construction with roof framing parallel to area separation wall (Section V, Item B.2a)



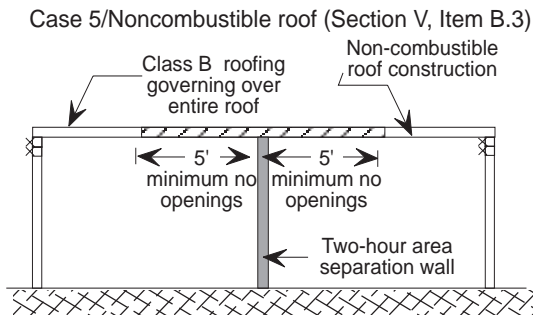
Case 4/ One-hour roof construction with roof framing not parallel to area separation wall (Section V, Item B.2b)



Plan view



Plan view

Figure 14/ Area separation wall parapet requirements (continued)

not less than one-hour fire-resistive construction for a width of not less than 5 feet on each side of the wall. This is illustrated in Figure 14, Case 3.

- b. Where roof-ceiling framing elements are not parallel to the wall, the entire span of such framing and elements supporting such framing shall be of not less than one-hour fire-resistive construction. This is shown in Figure 14, Case 4.

c. Openings in the roof shall not be located within 5 feet of the area separation wall.

d. The entire building shall be provided with not less than a Class "B" roof covering.

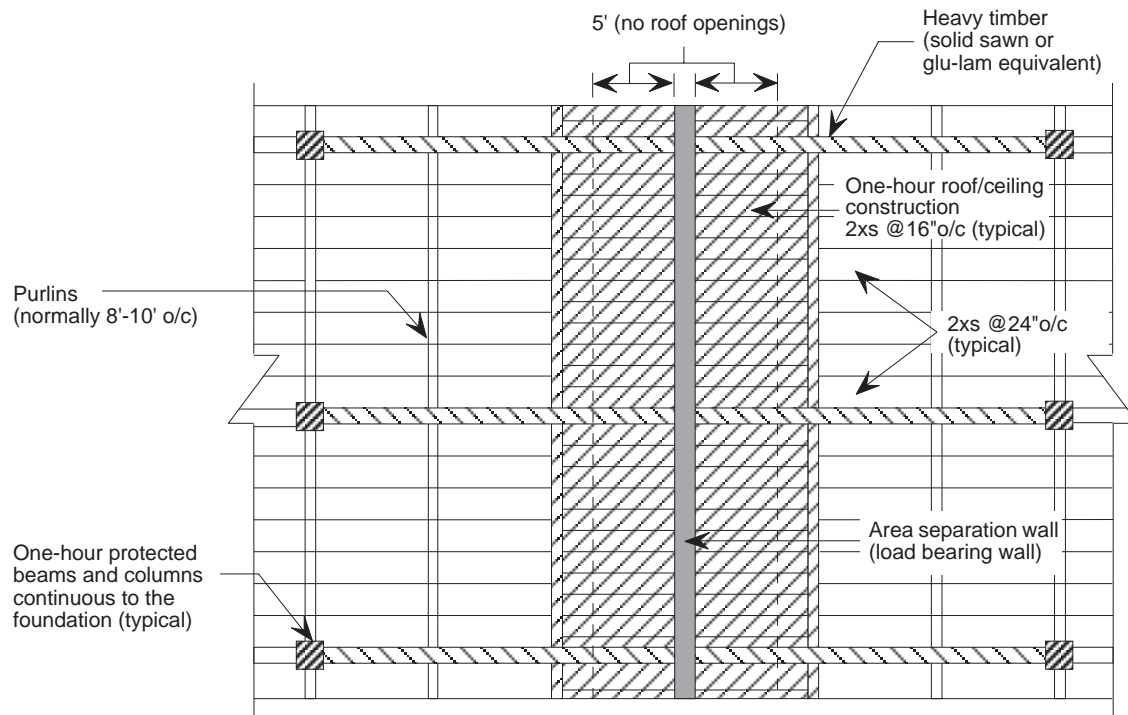
3. Two-hour area separation walls may terminate at the underside of noncombustible roof sheathing, deck or slab of roofs of noncombustible construction as shown in Figure 14, Case 5 provided:

a. Openings in the roof are not located within 5 feet of the area separation wall.

b. The entire building is provided with not less than a Class B roofing.

- C. Note that when fire-rated roof ceiling construction is used to permit the termination of an area separation wall at the roof level, the ceiling assembly must be either an assembly listed in Table No. 7-C or an assembly tested under the provisions of UBC Standard No. 7-1 for which test reports have been submitted as required by Section 104.2.8. Footnote 14 to Table No. 7-C allows the omission of the finished flooring normally required by Footnote 13 when the roof is not an occupied space.

- D. The exceptions found in Section V, Items B.1 and B.3

Figure 15/Example of acceptable one-hour construction and support for panelized roof system

- NOTE:
1. Beams framed not parallel to the area separation wall must be supported on the wall. No through-span beams or cantilevers over the wall are allowed.
 2. All framing is shown as an example only! Each individual case must be properly detailed on the plans according to the principles illustrated.
 3. All the roof framing must bear on top of the area separation wall.
 4. Any posts or columns occurring within the area separation wall must be individually protected to meet two or four-hour rating as required for the area separation wall.

Plan view
Panelized roof system

above can be applied as alternates to parapet requirements for area separation walls. These exceptions may also be used to fulfill the requirements of Section 709.4.1 for parapets on all exterior walls.

- E. The exception found in Section V, Item B.2, however, applies solely to area separation walls and should not be considered to be an alternate to the requirements of Section 709.4.

These provisions are the most commonly used and require additional interpretation.

1. One-hour fire-resistive construction is required for a width of not less than 5 feet on each side of the area separation wall. Since this ceiling protection must terminate on a roof framing member, the one-hour protection may need to extend more than 5 feet from the face of the wall. Furthermore, all members supporting any portion of the one-hour ceiling must be protected. The entire vertical load path must be protected down to the foundation.
2. The provisions of Section V, Item B are illustrated

in Figure 14.

3. Figure 15 is a plan view illustration of these provisions as they apply to a typical panelized roof system adjacent to an area separation wall.

- F. Parapets may be combined with construction meeting the requirements of Section V, Item B.2 to allow limited roof openings as long as a minimum 5-foot overlap of the two methods is provided. This is illustrated in Figure 16.

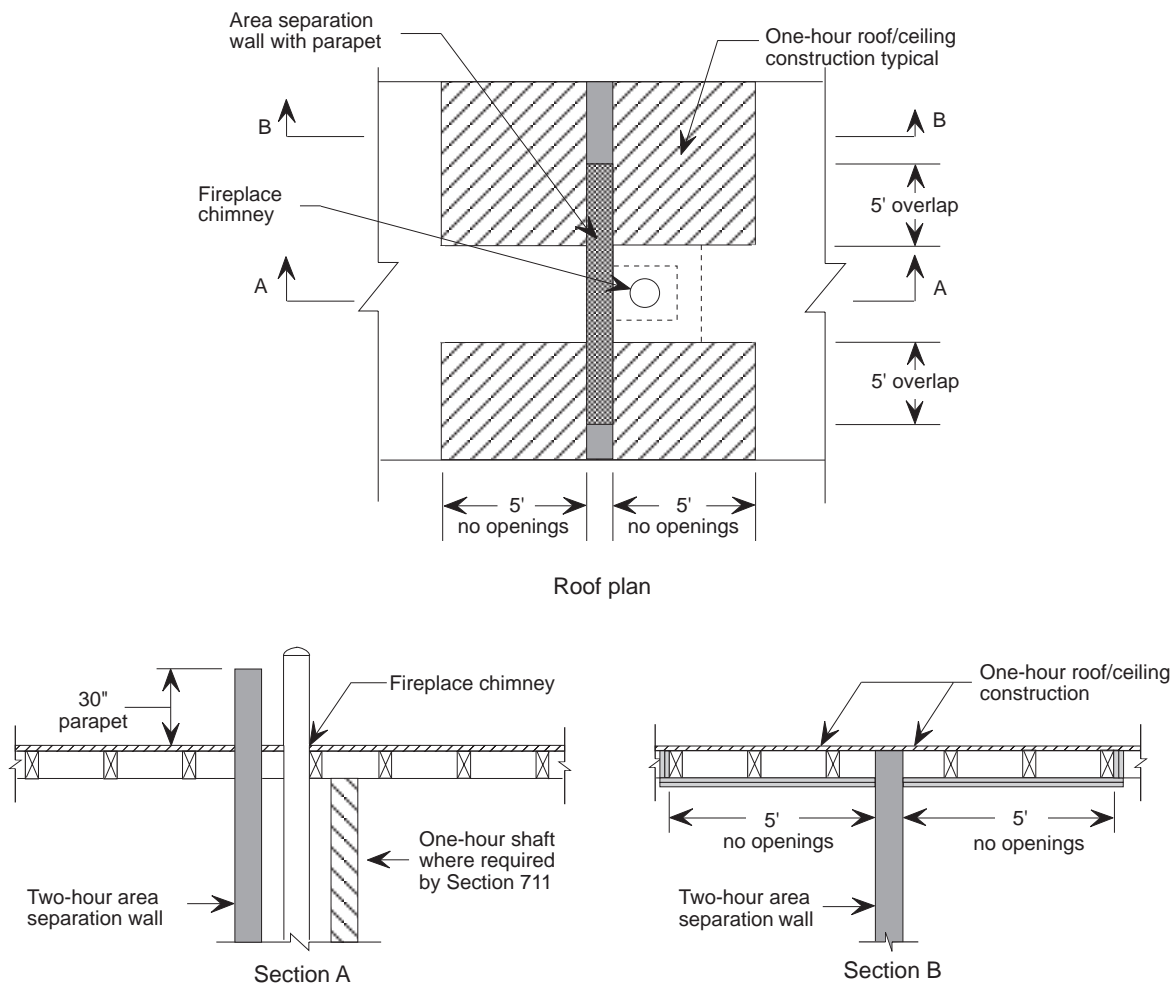
- G. Section 504.6.5 requires non-combustible faces be provided on the upper 18 inches of parapets. See Figure 24.

VI. Parapet Requirements With Varying Roof Heights

Section 504.6.4 and 504.6.6 regulate construction of area separation walls which separate building portions having different roof heights.

- A. Figure 17, Cases 1 through 5, illustrates how the provisions of Section 504.6.4 can be applied to address buildings having varying roof heights.

Figure 16/Acceptable combination of provisions



B. Section 504.6.6 states that such area separation walls may terminate at a point 30 inches above the lower roof level, provided the exterior wall for a height of 10 feet above the lower roof is of one-hour fire-resistive construction with openings protected by assemblies having a three-fourths-hour fire-protection rating. See Figure 18, Cases 1 and 2.

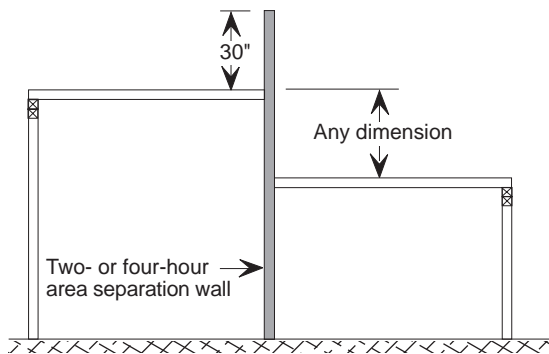
Note that other provisions of the Code may require the 10-foot extension to have more than a one-hour rating. For example, the portion of the wall above the lower roof becomes an exterior wall; therefore, exterior wall requirements for the particular type of construction may be more restrictive.

C. The exception to Section 504.6.6 permits the area separation wall to terminate at the sheathing of the lower roof provided the lower roof is of at least one-hour fire-resistive construction for a minimum width of 10 feet. See Figure 18, cases 3 and 4

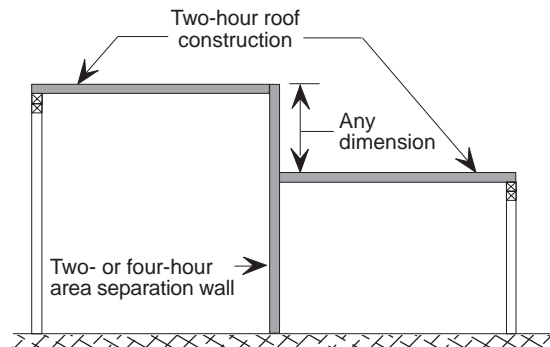
1. The minimum width of 10 feet is applicable when the roof/ceiling framing members are parallel to the area separation wall.
2. When framing members are not parallel to the area separation wall, the entire span of such framing shall be of not less than one-hour fire-resistive construction.

Figure 17/Section 504.6.4 parapet requirements for varying roof heights

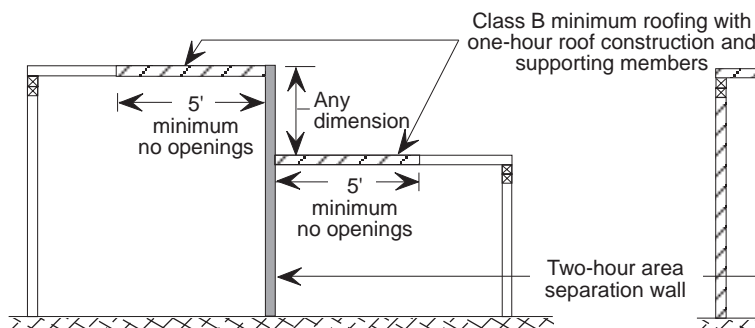
Case 1/Basic requirements



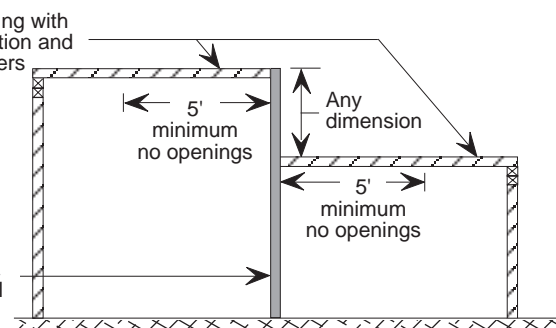
Case 2/Two-hour roof construction (Section V, Item B.1)



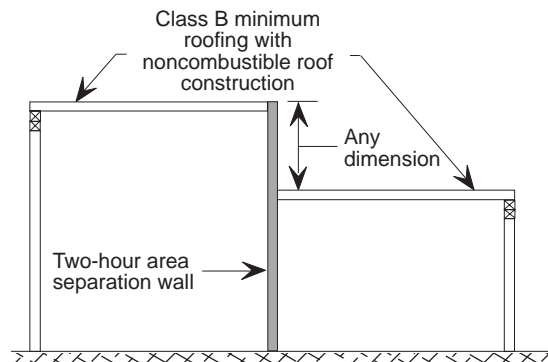
Case 3/One-hour roof construction-framing parallel to area separation wall (Section V, Item B.2a)



Case 4/One-hour roof construction-framing perpendicular to area separation wall (Section V, Item B.2b)



Case 5/Noncombustible roof (Section V, Item B.3)



3. In both cases:

- The elements (walls, beams and columns) supporting the roof-ceiling framing must also be of at least one-hour construction.
- No openings shall be located in the lower roof within 10 feet of the area separation wall.
- The wall above the lower roof must be of at least one-hour fire-resistive construction with three-fourths-hour protection of openings.

VII. Truss Installation

Installation of trusses presents special problems when a two-hour area separation wall terminates at the roof level rather than in a 30-inch parapet.

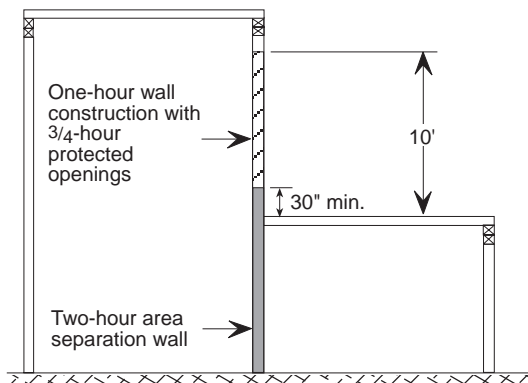
- A. Depending on the truss specified, a complying one-hour roof/ceiling assembly will usually consist of multiple layers of gypsum wallboard for the ceiling membrane. This additional ceiling weight must be considered in the truss design.

B. Another problem concerns the condition at the end truss when the trusses are parallel to the area separation wall. Any truss which is located at the ends of the 5-foot or greater span of required one-hour roof/ceiling construction must, in addition, support a cutoff partition as shown in Figure 19. This cutoff truss partition may be finished on only one side, provided the covering materials are constructed and supported as required for ceiling construction. It is important that the truss system structural design account for the additional weight the trusses must support.

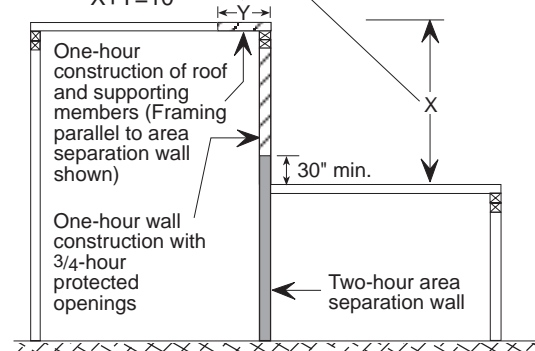
- C. Figure 20 shows three cases where trusses are framed perpendicular to the area separation wall. In order to avoid an unacceptable breach in area separation wall protection (shown in Case 1), trusses should be top chord-bearing as shown in Case 2. If this is not possible, some adequate means of extending the wall to the roof sheathing must be found. Case 3 is one

Figure 18/Section 504.6.6 parapet requirements for varying roof heights

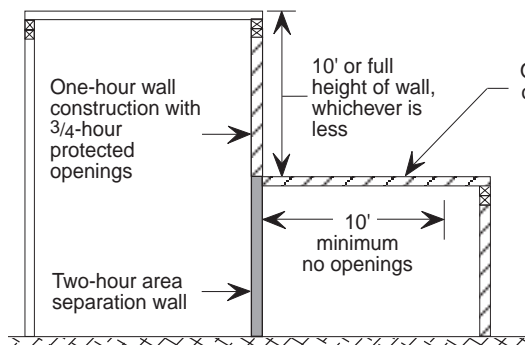
Case 1/Basic requirement



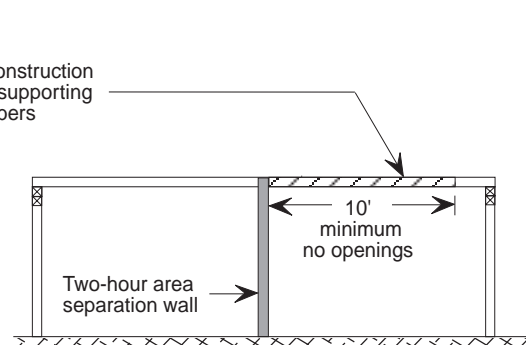
Case 2/Variation of basic requirement (roof framing parallel or not parallel to area separation wall)
 $X+Y=10'$



Case 3/Exception (framing parallel or not parallel to area separation wall)



Case 4/Variation of exception to Section 504.6.6 for level roof (framing parallel to area separation wall shown)



option. Trusses are not allowed to cantilever over the area separation wall.

VIII. Wall Construction

Fire-resistive wall assemblies must conform to the requirements contained in Chapter 7. This includes protection of penetrations.

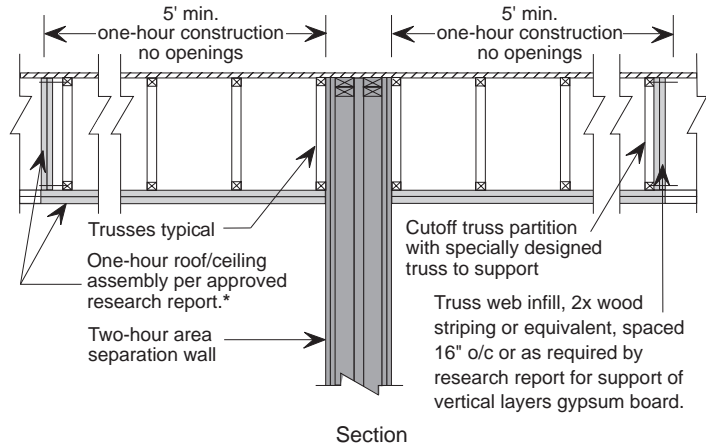
- A. Obviously, combustion air ducts will not be allowed to penetrate, or occur within, area separation walls. Refer to Building Newsletter 5-4 for acceptable penetrations.
- B. Special care must be taken at floor, wall and ceiling intersections to insure that the fire-resistive integrity of the wall is maintained.
 1. Figure 21 illustrates construction requirements for framing both parallel and perpendicular to the area separation wall.
 2. Figure 22 illustrates required blocking at floor intersections.
 3. Required blocking at wall intersections for single stud, staggered stud and double stud area separation walls is covered in Figure 23.
 4. An example of acceptable parapet construction is shown in Figure 24.

IX. Conclusion

To reduce the risk of fire propagation, a clear understanding of the purpose of area separation walls should be developed. The location and detailing of area separation walls should not be based solely on compliance with Code sections. Such walls should comply with the intent of the Code as well, namely, to provide an effective physical barrier to the spread of fire.

Reference: Building Standards Magazine, September-October 1982, Area Separation Walls Revisited.

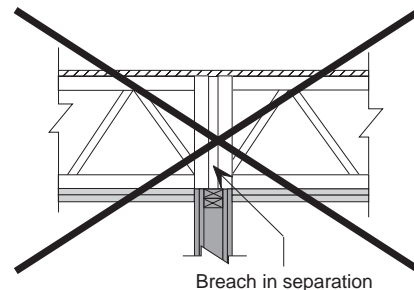
Figure 19/Truss framing parallel to area separation wall



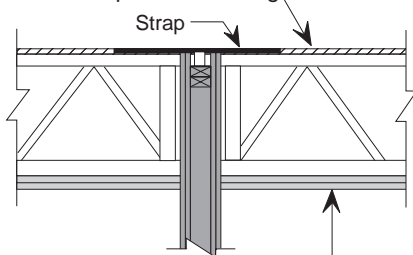
* Applicant must provide research report numbers for fire-resistive construction and cutoff truss design.

Figure 20/Truss framing perpendicular to area separation wall

Case 1/Breach in separation not permitted

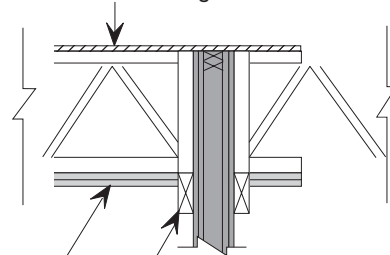


Case 2/Top chord-bearing



One-hour roof/ceiling assembly per approved research report; full span of trusses and support of trusses must also be one-hour. Typical for all cases.

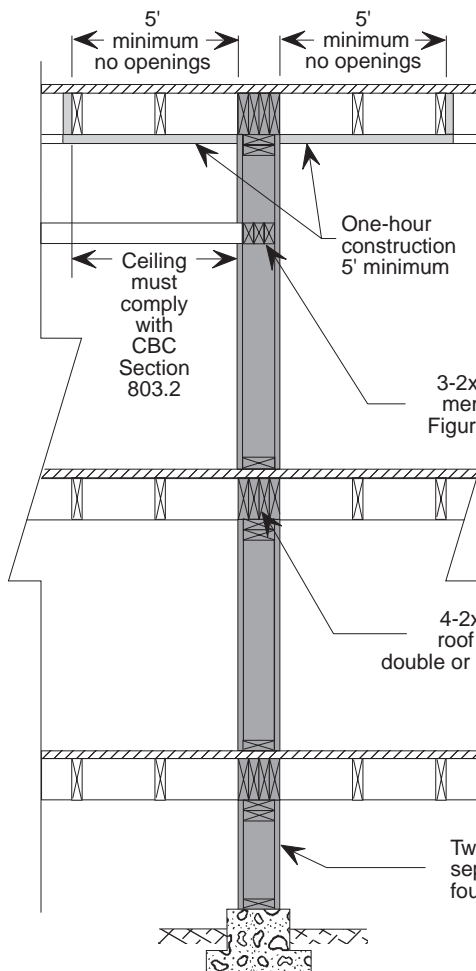
Case 3/Bottom chord-bearing



Size of support adequate for truss end-bearing requirements (support must be attached with fasteners capable of spanning across 2 layers of 5/8" Gypsum board).

Figure 21/ Wall construction details

Case 1/Framing parallel



Case 2/Framing not parallel

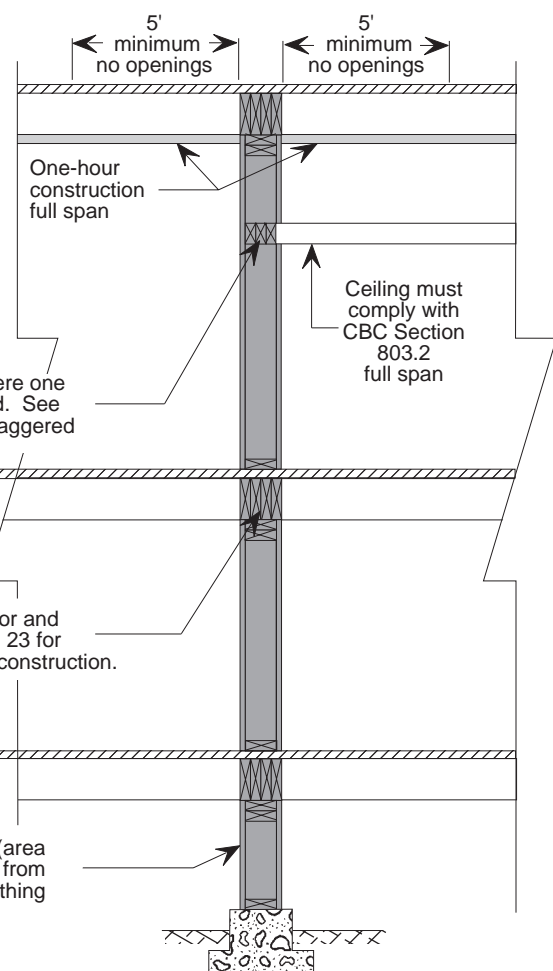
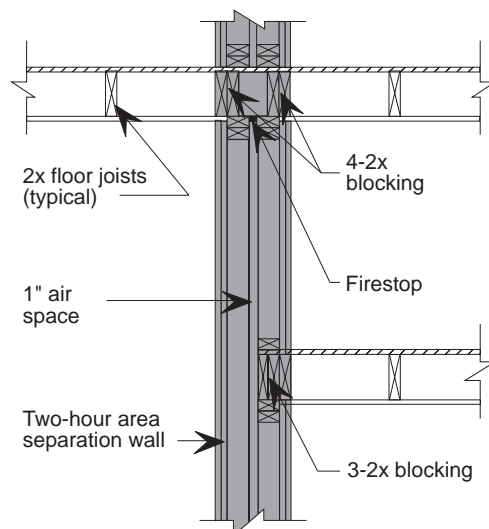
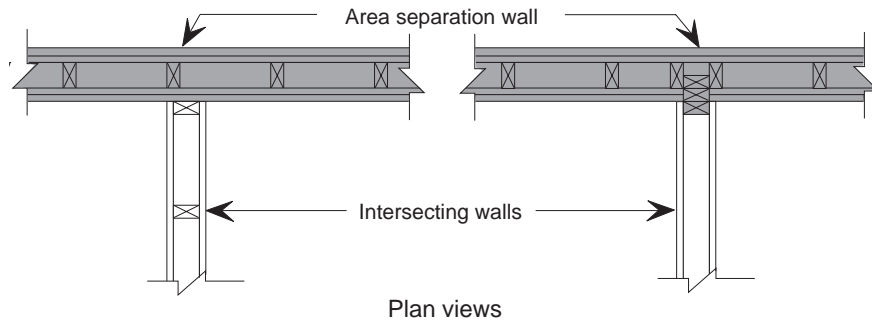
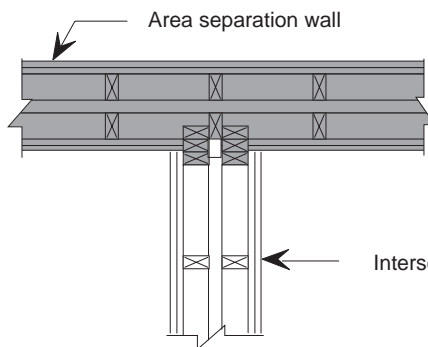
**Figure 22/**Required blocking at floor intersections

Figure 23/ Required blocking at wall intersections

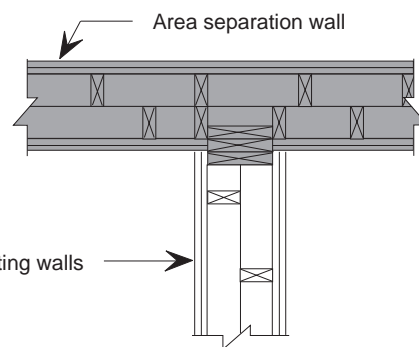
Case 1/ Single stud area separation wall



Case 2/ Double stud area separation wall



Case 3/ Staggered stud area separation wall



These sketches indicate additional studs required to prevent a breach of the area separation wall. Details on the plans must indicate dimensions and specifications of all portions of construction.

Figure 24/Parapet construction